Improving the Quality of Pediatric Emergency Care Using an Electronic Medical Record Registry and Clinician Feedback

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Summary: Emergency departments (EDs) routinely collect substantial patient data that have the potential to provide information on the quality of care given to acutely ill and injured children. The capacity to capture and analyze these data, however, is limited. The increasing use of electronic heath records (EHRs) in EDs provides an opportunity to access patient clinical data and track and evaluate quality of care, performance measures, and patient outcome measures efficiently. EHRs also have the potential to develop patient registries using electronic abstraction instead of the resource- and labor-intensive manual chart abstraction required for paper records. Abstracting data in an automated way from EHRs could make it possible to evaluate the quality of patient care, assess health care resources, and reduce the incidence of adverse events. Using the novel health information technology (IT) application of natural-language processing (NLP), clinical data can be extracted from both discrete and free-text fields of an EHR.

This project is developing a registry to collect and report quality measures of emergency care provided to children. To do this, a multi-phase process is being implemented to: 1) develop an emergency care visit registry for pediatric patients using EHR clinical data; 2) report performance measure outcomes by ED site and individual clinicians; and 3) evaluate whether providing performance measure feedback to sites and clinicians improves performance and decreases variation between sites and clinicians. This project uses the infrastructure of the Pediatric Emergency Care Applied Research Network (PECARN), which was established in 2001 as a federally funded national network for research on pediatric emergencies and emergency medical services for children. The emergency care visit data registry for pediatric patients will be known as the PECARN Registry.

During the first phase, the PECARN Registry is being developed by merging data from four hospitals and four satellite sites within the network. A test data transfer will enable each site to upload data for a 1-month period from the preceding calendar year. This will allow testing and evaluation of the database and data upload, the NLP algorithm derivation, the merging process, and the quality assurance process. After completing the test data transfer, electronic data on all pediatric ED patients from each site from the prior calendar year will be transmitted to a central data coordinating center. Subsequent data will be uploaded monthly from each site for a period of 18 months, providing 2.5 years of data in total and representing approximately 1,040,000 pediatric ED visits.

During the second phase, the Registry will be used to collect and report on 14 performance measures. Ideal benchmarks of care for each performance measure will be determined by using the Achievable Benchmarks of Care method and by convening an expert panel. The benchmarks of care will gauge the performance measure outcomes. Quality performance measure report cards (hereafter, report cards) will

be developed for ED sites and for individual clinicians at each site. The site-level report cards will contain outcomes for all 14 performance measures, and the corresponding benchmarks will be noted. The clinician-level report cards will include individual clinician outcomes on five of the 14 performance measures. The five clinician-level performance measures are within the locus of control of the individual clinicians and amenable to physician behavior change.

During the third phase, the clinician and site report cards will be generated and distributed on a monthly basis. The site-level report cards will include the performance measure outcome results from the other sites as a comparison. A time-series trial will assess whether the clinician feedback results in improvements in the performance measures themselves and decreases variation in performance across clinicians.

Specific Aims:

- Develop an emergency care visit registry for pediatric patients. **(Ongoing)**
- Use this registry to collect stakeholder-prioritized emergency care performance measures for important pediatric medical and trauma conditions at the level of both the ED and individual clinician. **(Upcoming)**
- Use this registry to report performance to individual ED clinicians. **(Upcoming)**

2012 Activities: Dr. Alpern, her project team, all site co-investigators, research coordinators, IT staff, and data coordinator staff continued efforts to develop the PECARN Registry. The team worked on mapping variables at each site's EHR that will be needed for the Registry and used for the performance measures. This was an extensive process, as each ED visit involves many data elements to be abstracted from the EHR. For each of the four primary and satellite sites, the project team reviewed each variable that will be in the registry, including its location and format in the EHR, in order to understand commonalities and differences among variables. As the team worked through this process, they developed a data dictionary to document their findings. The process began in July 2012 and culminated October 25-26, 2012, with a project team meeting to finalize all registry variables and the data dictionary. Thereafter, the data dictionary was translated into an XML schema that reflects how the variables map to the EHRs.

A process for extracting data from each site's EHR to import into the Registry's central database was developed. This process included identifying tables containing necessary data, generating SQL code, coding data to match the central database, and converting data into an XML format.

Lastly, the team worked on determining how to de-identify data that will be available in the Registry. The goal is to pull data from the EHRs using the data dictionary and schema and have it de-identified in the Registry. The team has selected a de-identifying software program and is in the process of populating the program with appropriate codes to facilitate the process.

Preliminary Impact and Findings: This project has no findings to date.

Target Population: Pediatric*

Strategic Goal: Develop and disseminate health IT evidence and evidence-based tools to improve health care decisionmaking through the use of integrated data and knowledge management.

Business Goal: Implementation and Use

This target population is one of AHRQ's priority populations.